

**REMARKS**

Claims 1-24 have been canceled. Claims 25-29 remain in the application. Claims 30-34 have been newly added for consideration.

**Allowed Claims:**

Applicants note with appreciation the Examiner's indication that claims 29-30 are allowed over the prior art of record. While page 2 of the Office Action includes these claims as part of a rejection under § 103(a), this is believed to be a typographical error since no specific rejections have been made against these claims and page 3 of the Office Action explicitly states that these claims stand allowed.

**Rejection under 35 U.S.C . § 103(a):**

The sole rejection in this case stands against claims 25-28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,658,174 to Doerr in view of U.S. Patent 6,084,050 to Ooba et al. Both references are newly cited by the Examiner. This rejection is respectfully traversed based on the following discussion.

Briefly, the present invention is directed to a thermo-optic switch. A thermo-optic switch comprises two planar waveguides and a heating element

coupled to at least one of the planar waveguides. Typically, wire bonding is the technique used for making the connection between the power supply and the heating elements. According to embodiments of the present invention, the heating element is coupled to a package substrate using solder bumps. In the example of Figure 1, one end of the heating elements 110, 112 makes contact with conductive strips 151 and 152, respectively, and the other end of the heating elements 110, 112 makes contact with conductive strip 153 as a “common”, which in one embodiment may be coupled to a common ground. Accordingly, this simplifies the procedure for manufacturing higher order matrix thermo-optic switches (TOS) as well as allows TOS packages to be surface mounted.

**U.S. Patent 6,658,174 to Doerr:**

Doerr appears to be directed to a push-pull thermo-optic switch . As understood, the Examiner has relied on Doerr for substantially teaching the invention including a thermo optic switch comprising a first substrate, and first waveguide with a proximate heating element. However, the Examiner has recognized that Doerr does not teach or suggest a package substrate solder bonded to the first substrate via the heating element.

**U.S. Patent 6,084,050 to Ooba:**

Ooba appears to be directed to thermo-optic devices including a digital thermo-optic switch and an optical add/drop multiplexer (ADM) filter. The Examiner has particularly relied on Figure 13 and the corresponding text starting at line 62 of column 16. Figure 13 is stated to be a “structure of ADM for simultaneously making mixing and split of a selected channel wavelength.

The Examiner has indicated that “*Ooba et al. teach a package substrate solder bonded to the first substrate via a heating element*” (emphasis added). However, it is respectfully submitted that Ooba only shows one substrate with waveguides and heaters positioned thereon. Ooba does not show two substrates solder bonded together and indeed does not teach solder bonding at all. The entire Ooba reference has been searched and solder bonding in not mentioned in any context, let alone in the context as claimed by Applicants.

Independent claim 25 recites “A thermo-optic switch comprising: a first substrate having a first waveguide; a heating element in proximity to the first waveguide; and a package substrate solder bonded to the first substrate via the heating element” (emphasis added).

Similarly, independent claim 31 recites “A thermo-optic switch comprising: a first substrate having a plurality of waveguides; a plurality of heating elements in proximity to each of said plurality of waveguides; and a package substrate having a plurality of conducting strips each solder bonded to

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Examiner: Mai Huong C. Tran  
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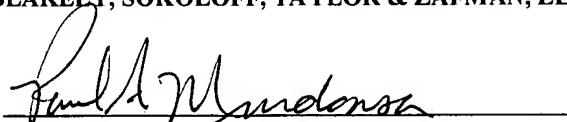
one of said plurality of heating elements and further having a common  
conducting strip solder bonded to the plurality of heating elements" (emphasis  
added).

It is respectfully submitted that the features recited in claims are not  
taught or suggested by Doer or Ooba, either alone or in combination. It is thus  
requested that rejection based on these references be withdrawn.

In view of the foregoing, it requested that the application be reconsidered, that  
claims 25-34 be allowed and that the application be passed to issue. Please  
charge any shortages and credit any overcharges to our Deposit Account  
number 02-2666.

Respectfully submitted,  
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